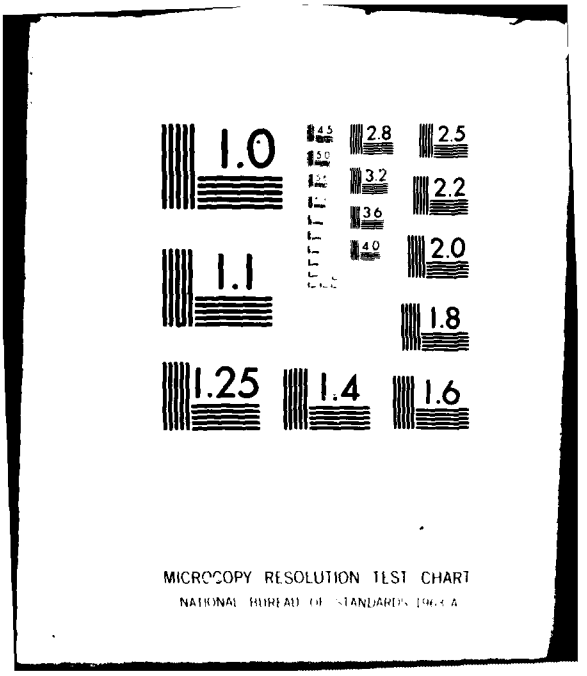
AD-A087 409 COMMAND AND CONTROL TECHNICAL CENTER WASHINGTON DC F/G 15/7
THE CCTC QUICK-REACTING GENERAL WAR GAMING SYSTEM (QUICK). GENE--ETC(U)
JUN 77 D J SANDERS, P F MAYKRANTZ, J M HERRIN
UNCLASSIFIED CCTC-TM-153-77-CH-1 SBIE-AD-E100 372 NL

END
DATE FILMED
9-80
DTIC


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

DDC FILE COPY

ADA087409

CCTC

DEFENSE COMMUNICATIONS AGENCY

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED

TECHNICAL MEMORANDUM
TM 153-77
1 JUNE 1977

AD-E100372

COMMAND & CONTROL TECHNICAL CENTER

12

LEVEL III

A045422

THE CCTC QUICK-REACTING GENERAL WAR GAMING SYSTEM (QUICK)

DTIC
ELECTE
AUG 1 1980
S D
B

80 6 12 011

RECORD OF CHANGES

CHANGE NUMBER	DATED	DATE ENTERED	SIGNATURE OF PERSON MAKING CHANGE

DEFENSE COMMUNICATIONS AGENCY
COMMAND AND CONTROL TECHNICAL CENTER
WASHINGTON, D. C. 20301

IN REPLY REFER TO: C314

3 June 1980

TO: RECIPIENTS

SUBJECT: Change 1 to Technical Memorandum TM 153-77, The CCTC QUICK-Reacting General War Gaming System

1. The enclosed package contains change pages and original pages for the document. The document was reprinted because of poor quality of print of the original issue. The old document should be destroyed according to applicable security regulations.

2. A list of Effective Pages to verify the accuracy of this manual is enclosed.

3. When this change has been posted, make an entry in the Record of Changes.

FOR THE DIRECTOR:

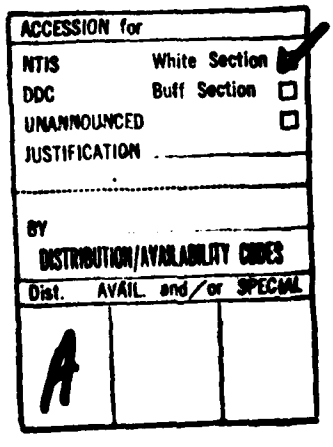
J. DOUGLAS POTTER
Assistant to the Director
for Administration

42 Enclosures
Change 1 Pages

EFFECTIVE PAGES - APRIL 1980

This list is used to verify the accuracy of TM 153-77 with change 1 pages inserted. Original pages are indicated by the letter 0 and change 1 pages by the numeral 1.

Page No.	Change No.
Title Page	0
ii	1
iii-iv	0
v	1
1	0
2	1
3-12	0
13	1
14-19	0
20	1
21	0
22-24	1
25-30	0
31	1
32	0
33-34	1



COMMAND AND CONTROL TECHNICAL CENTER

TECHNICAL MEMORANDUM TM 153-77

1 June 1977

THE CCTC QUICK-REACTING GENERAL WAR GAMING SYSTEM

(QUICK)

General Description

SUBMITTED BY:

C. G. THOMPSON
Project Officer

APPROVED BY:

R. E. HARSHBARGER
Acting Deputy Director
NMCS ADP

Copies of this document may be obtained from the Defense Documentation Center, Cameron Station, Alexandria, Virginia 22314

Approved for public release; distribution unlimited.

ACKNOWLEDGMENT

This document was prepared under the direction of the Chief for Military Studies and Analysis, CCTC, in response to a requirement of the Studies, Analysis, and Gaming Agency, Organization of the Joint Chiefs of Staff. Technical support was provided by System Sciences, Incorporated under Contract Number DCA 100-75-C-0019. Computer Sciences Corporation prepared change set one under Contract Number DCA 100-78-C-0042.

CONTENTS

Section		Page
	ACKNOWLEDGMENT	ii
	ABSTRACT	v
1	SYSTEM DESCRIPTION	1
	1.1 Purpose	1
	1.2 Program Environment - QUICK System Overview	1
	1.3 Computer Software Environment and Programming Languages	5
	1.4 Equipment Environment	5
	1.5 The QUICK System Data Base	6
	1.5.1 Nature of the Data Base	6
	1.5.2 Contents of Data Base	6
	1.6 Characteristics of the Plan Generation Process	6
	1.6.1 Constraints and Uncertainties	7
	1.6.2 Detailed Sortie Generation	8
	1.6.3 Naval Forces	8
	1.6.4 Target Defenses	9
	1.6.5 Plan Evaluation	9
	1.7 System Interfaces	9
2	USER/SYSTEM INTERACTION	10
	2.1 Text English Dictionary	10
	2.2 Imperative Sentences	11
	2.3 Dictionary Entries and Sentence Usage	11
	2.3.1 Dictionary Entries	11
	2.3.2 Sentence Usage	11
3	ATTRIBUTE INPUT AND STANDARD OUTPUT	14
	3.1 System Inputs	14
	3.2 Primary Outputs	17
4	APPLICATIONS	25
	4.1 Potential Applications	25
	4.1.1 War Plan Evaluation	25
	4.1.2 Force Posture Studies	25
	4.1.3 Studies of Alternate Strategies	26
	4.2 Inappropriate Applications	26
	GLOSSARY	29
	DISTRIBUTION	31
	DD FORM 1473	33

ILLUSTRATIONS

Figure		Page
1	Major Subsystems of the QUICK System.....	2
2	Procedure and Information Flow in QUICK/HIS 6000.....	3
3	Detailed Bomber Plan from Plan Generator.....	20
4	Detailed Missile Plan from Plan Generator.....	24

TABLES

Number		Page
1	Typical Dictionary Values.....	12
2	Typical Data Base Elements Included in QUICK.....	15
3	QUICK Classes.....	16
4	Typical Data Base Item.....	19
5	QUICK Data Constraints.....	19

ABSTRACT

This document is a nontechnical description of the computerized Quick-Reacting General War Gaming System (QUICK). It includes a broad description of system operation, input data requirements, available outputs, and typical applications.

QUICK is a tool for examining various facets of possible general wars under a variety of conditions of force posture, strategies, and starting conditions. Based upon suitable input data, QUICK will automatically generate global strategic nuclear war plans, provide statistical output summaries, and supply inputs to external simulators.

The QUICK system uses an integrated data base and has been programmed in FORTRAN for use on the CCTC HIS 6000 computer system. QUICK is structured to provide non-programmer users a direct interactive capability for a wide range of war gaming applications.

The following is a list of associated documents on the QUICK system.

a. USERS MANUAL
   Computer System Manual UM 9-77, Volume I
   Computer System Manual UM 9-77, Volume II
   Computer System Manual UM 9-77, Volume III
   Computer System Manual UM 9-77, Volume IV
   Provides detailed instructions for applications of the system.

b. PROGRAM MAINTENANCE MANUAL
   Computer System Manual CSM MM 9-77, Volume I
   Computer System Manual CSM MM 9-77, Volume II
   Computer System Manual CSM MM 9-77, Volume III
   Computer System Manual CSM MM 9-77, Volume IV
   Provides detailed instructions for maintenance of the system.

SECTION 1. SYSTEM DESCRIPTION

1.1 Purpose

This General Description is a nontechnical description of the computerized Quick-Reacting General War Gaming System (QUICK). It includes a broad description of system operation, input data requirements, available outputs, and typical applications.

The remainder of this section provides an overview of the QUICK system, its major parts, and the hardware/software environment in which it is operational.

1.2 Program Environment - QUICK System Overview

The QUICK-Reacting General War Gaming System (QUICK) is a unique analytical tool which provides a comprehensiveness to strategic war gaming that has not been available through other computerized models. QUICK is designed to assist in the study of strategic conflicts involving a large-scale exchange of nuclear weapons. Toward this end, the system encompasses three major capabilities which are applicable to a wide range of studies: first, for a given offensive missile and bomber force and a specific set of targets, QUICK produces a detailed plan of attack which is near optimum for the conditions specified by the user. Second, it provides an expected-value estimate of the results of that attack. Finally, it supplies detailed inputs to external simulators.

QUICK is structured into four major subsystems: Data Management, Weapon/Target Identification, Weapon Allocation, and Sortie Generation. The principal tasks associated with each of these functional subsystems are summarized below.

a. Data Management: Assembles and reformats the target and non-target data required for a particular plan.

b. Weapon/Target Identification: Selects and processes the Red and/or Blue Forces pre-specified for a particular plan.

c. Weapon Allocation: Allocates offensive weapons to selected targets.

d. Sortie Generation: Prepares and evaluates missile and bomber attack plans.

Figure 1 displays the programs which comprise each subsystem.

Figure 2 illustrates the communication with the Central Operations Processor (COP) or executive software and the entire procedural and informational flow within the QUICK system. The communication lines infer action with the COP, Integrated Data Base and related modules which may

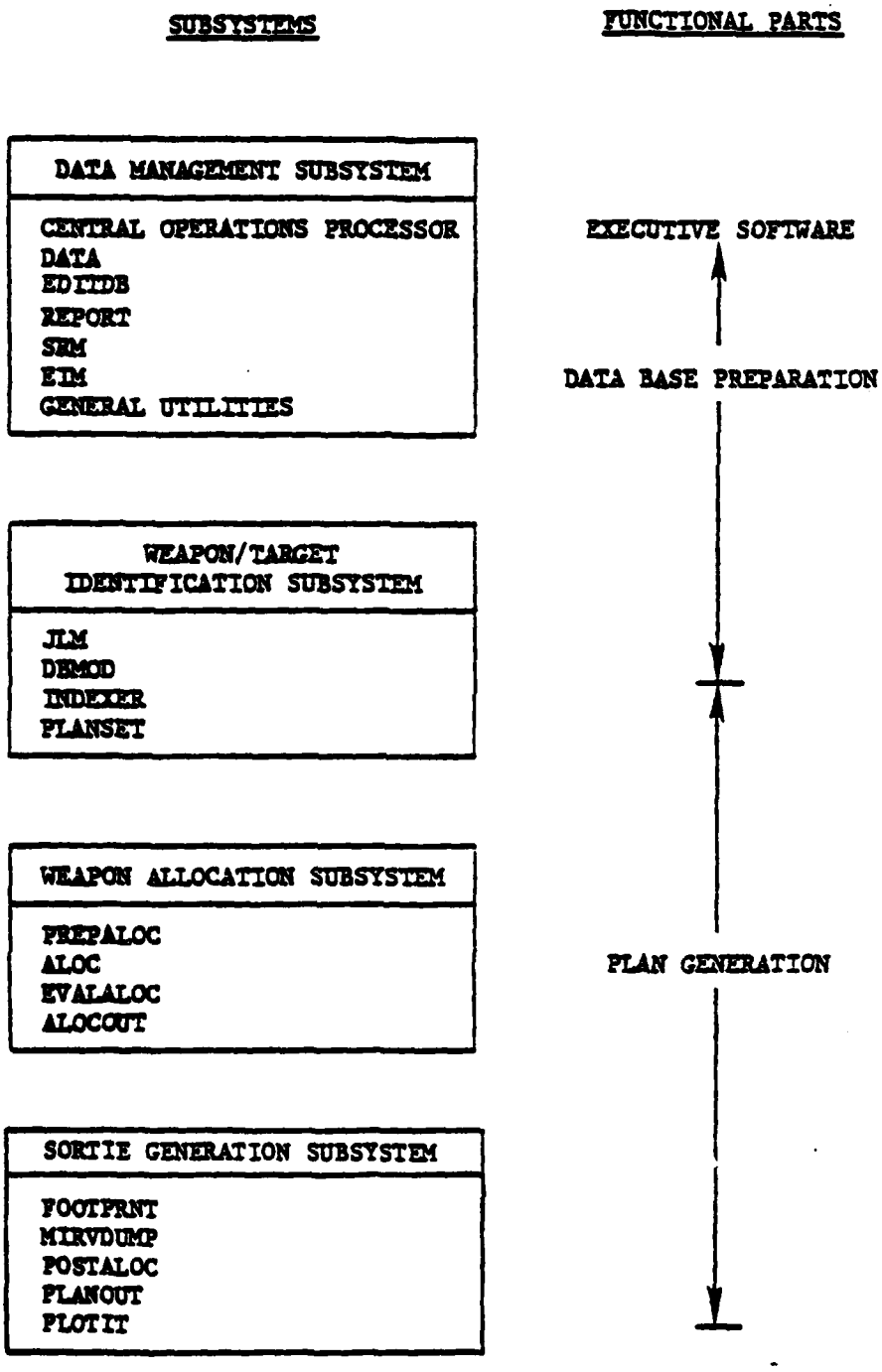


Figure 1. Major Subsystems of the QUICK System

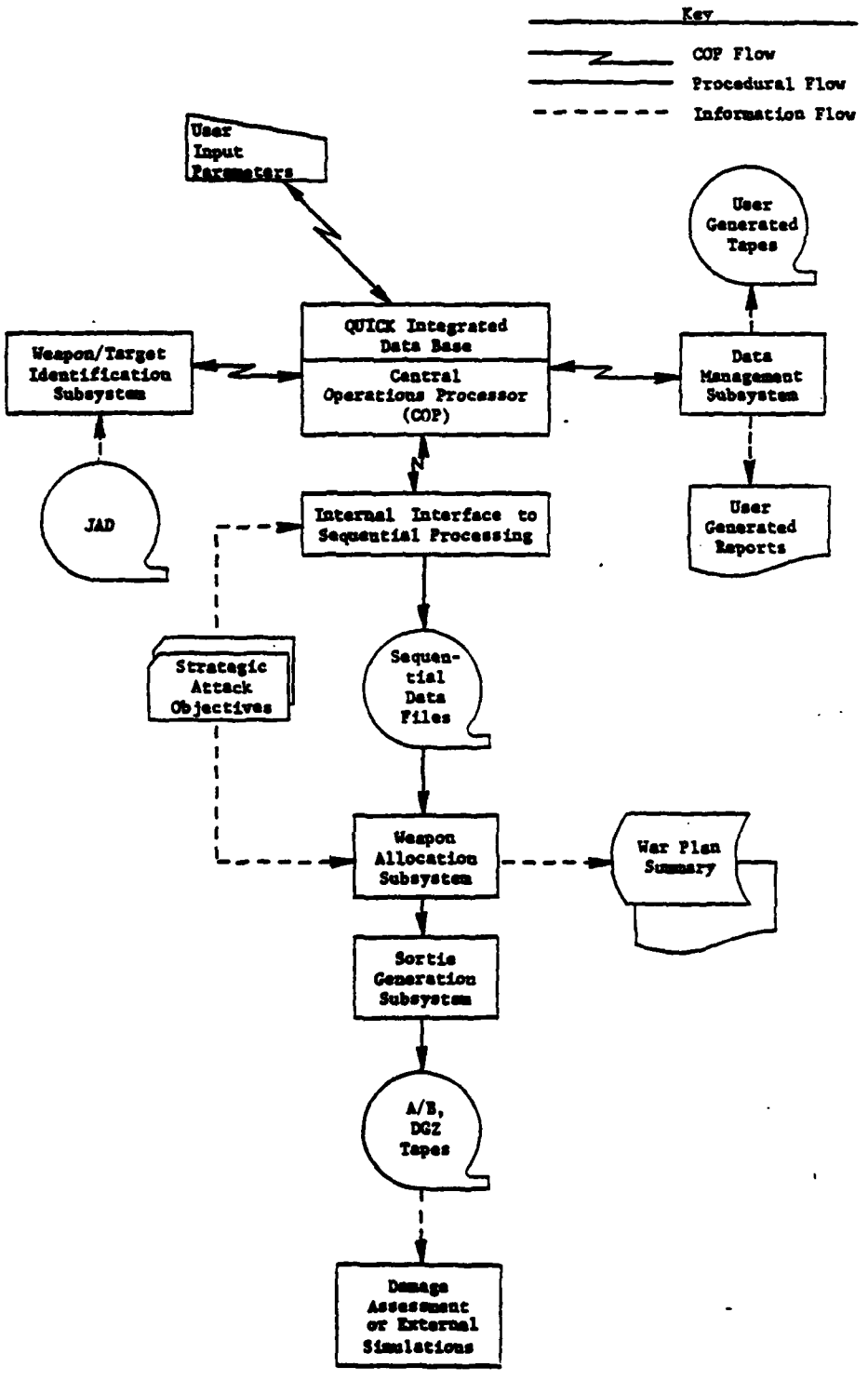


Figure 2. Procedure and Information Flow in QUICK/HIS 6000

be executed in any reasonable order. The required processing sequence is shown by solid lines, and the information flow by broken lines.

Processing is initiated by inputting the parameters which identify the potential targets which are to be extracted from the CCTC Joint Resource Assessment Data Base (JAD) files. The COP stores selected data and dynamically conducts the proper linkage for referral by other modules within the QUICK system. Alternatively, required target data is obtained from existing updatable QUICK Data Bases and also stored and linked by the COP. Following this, specified forces are defined within the developed QUICK Data Base and processed by the Weapon/Target Identification subsystem, resulting in a Game Data Base which reflects the selected forces and targets.

The next step is to prepare an attack plan for the opposing forces. This consists of a force allocation by the Weapon Allocation subsystem, and a detailed set of attack plans prepared by the Sortie Generation subsystem.

The major inputs required to initiate this phase of processing are:

a. A game data base prepared by the Data Management and Weapon/Target Identification subsystems.

b. A set of parameters which relate to the strategy associated with the plan which is to be developed.

These parameters are supplied by the planner. They reflect his views as to the strategic attack objective, in terms of the relative values of the various targets being considered, the forces to be withheld, the targeting constraints to be observed, and the initiating force; i.e., which side attacks first.

The target values which are computed on the basis of these parameters reflect in a very significant way the major strategic objectives of the resultant war plan. These values are relative values and are partially contained in the data base itself. QUICK has 15 specific classes of targets. The relative values of the targets contained in any one class are included in the data base: the strategic objectives of the planner who wants to use the plan generation function are expressed in how the value scales of these various classes of targets are related to one another. The user thereby puts more or less relative importance on each of the classes of targets in accomplishing the strategic objectives that he chooses. This, of course, will be related to the kind of strategy he is contemplating for the particular war game, whether a first or second strike, and so forth.

Having established a value for each target, the plan generation phase mathematically allocates the weapons (e.g., Red weapons to Blue targets) and prepares the detailed missile and bomber attack plans. If desired, the plans may be printed, inspected, and altered by changing the attack objectives and repeating the process. The series of Red missile and bomber events corresponding to the sortie plan is prepared in a form suitable for input to external simulators. As a user option, a war plan summary is provided which includes an expected-value estimate of the results of the attack. In addition, the aim point, Desired Ground Zero (DGZ), for each planned weapon can be output for subsequent evaluation utilizing an external damage assessment system.

While the system can proceed automatically through all steps if desired, it may be halted at the end of each module (or program), and the available output inspected for correctness and adequacy. There are standard outputs from each module and, also, mechanisms exist for producing generalized outputs (either tape/disk or printed reports). Through the COP, users may request output in any format of data items that reside within the Integrated Data Base. The user has complete flexibility in displaying needed reports.

This generalized output capability significantly enhances user flexibility in war gaming applications of the QUICK system as well as provides an added dimension to the military analysts who utilize the QUICK system.

1.3 Computer Software Environment and Programming Languages

The QUICK system runs under control of the HIS 6000 GCOS (General Comprehensive Operating Supervisor). The data base is created and maintained using a HIS data management subsystem called Integrated Data Store (IDS). Except for a few utility type subroutines which are written in the Generalized Machine Assembly Processor (GMAP) language of the HIS 6000 computer system, all QUICK programs are programmed in the FORmula TRANslator (FORTRAN) computer language.

1.4 Equipment Environment

The QUICK system is operational on the CCTC HIS 6000 computer system. Available to the QUICK system in addition to standard peripheral equipment are three 6000 processing modules, four 6000 system controllers, six 64K memory modules, and two 7-channel and 14 9-channel magnetic tape handlers. Type 181 and 190 disk storage units are available for permanent files.

Types of available remote access devices relevant to the interactive capability are:

a. VIP 786W - CRT Subsystem (EIA or 188C)

b. KSR 33B - Teletype 188C (TTY)

c. VIP 7705 - CRT Subsystem (EIA or 188C)

d. RLP 300 - Remote Printer (EIA or 188C)

e. IBM 2741 - Communications Terminal

1.5 The QUICK System Data Base

1.5.1. Nature of the Data Base. The QUICK data base is controlled by the IDS subsystem of the HIS. This type of data base permits all defined records to be dynamically linked together in some specified logical fashion. This linkage of entries allows for a generalization of data management functions; that is, record creating, updating, editing, and displaying no longer have to be conducted in a rigid structure. Through knowledge of the defined data base structure, developed modules within QUICKs data management subsystem may query the IDS data base in any manner as dictated through user commands.

1.5.2. Contents of Data Base. To provide a flexible data base, force structures corresponding to procurement schedules and to selected intelligence projections can be maintained for both Red and Blue forces or other forces. The data base contains the information required to define:

a. The capabilities and characteristics of the offensive and defensive weapon systems

b. The physical characteristics of the installations to be considered as potential targets

c. Related geographic-type data required by the system for plan generation describing penetration and depenetration corridors.

d. Planning parameters such as the estimated probability of destruction before launch (DBL) established for each offensive weapon system.

1.6 Characteristics of the Plan Generation Process

The plan generation process, hereafter referred to as the Plan Generator, creates a plan for each missile and bomber weapon in the game.* Two major phases of processing are associated with plan development. The initial phase provides an allocation of weapons to targets that maximizes the expected damage to the opposing target set within constraints imposed by the user. For efficiency in this phase, the offensive weapons are aggregated into groups which share delivery vehicle characteristics and are located in the same geographic area. Thereafter a representative weapon from each group is considered as the weapon to be allocated. In the second phase of processing, the initial allocation is refined so that specific weapons are assigned to specific targets. Then the sortie specifications for each delivery vehicle are prepared.

*Operationally, the plan generation process (or Plan Generator), consists of the Weapon Allocation, and the Sortie Generation subsystems of QUICK.

Each sortie from each bomber base or missile launch site is constructed as a detailed series of events which constitute the plan for each delivery vehicle.

1.6.1 Constraints and Uncertainties. During the weapon allocation phase, the Plan Generator explicitly considers several operational constraints and uncertainties. Among these are:

a. Physical constraints on weapon systems: operational constraints such as range, speed, and operational alert status are considered in developing the allocation. Optional capabilities are provided which permit the user to direct the assignment of a specific type of weapon to a target. Furthermore, weapon groups can be restricted from allocation against specified geographical regions of the target area, specific target types, or even a specific target.

b. Time dependence of target value: target values are established on the basis of input parameters provided by the user. These values can be defined as being time dependent, so that the assigned value of the target will degrade over time and can change at five different time intervals.

c. Planning factor uncertainties: the weapon allocation phase of plan generation explicitly considers uncertainty in various factors affecting weapon target interactions. Variances and uncertainties of target hardness, time dependence of target value, level of terminal ballistic missile defense, and interweapon correlation are considered in making weapon allocations. The plan is then constructed to be relatively insensitive to variance from the planned value established for such parameters.

d. Correlation in weapon delivery probabilities for similar weapon systems: in addition to considering the weapon system constraints of range, speed, and reliability, the allocator explicitly considers the interweapon correlations in delivery probabilities (i.e., risk factors in weapon failure modes which are shared by weapon systems of similar characteristics). The intent here is to provide QUICK with some basis for estimating the degree of risk which is shared by weapons, so that the Plan Generator can plan around these shared risks. The use of this technique ensures that the final plan will reflect a reasonable level of cross targeting. Thus, unexpectedly high failure rates for any specific weapon type, or group of weapons, will not result in a catastrophic failure of the war plan.

e. Prescribed levels of destruction: the user may prescribe for any target, or set of targets, the minimum or maximum damage expectancy which is to be achieved during the weapon allocation phase.

1.6.2 Detailed Sortie Generation. During the second phase of processing, the Plan Generator converts the allocation of weapons to targets, developed in the initial phase, into a plan of sufficient detail that it can be used as input to external simulators or damage assessment models. The development of bomber plans requires the geographic grouping of targets for assignment to a single bomber. In accomplishing this, the Plan Generator assigns the targets to the aircraft on specific bases, taking into account the number and types of bombs carried by each aircraft configuration as well as the need to coordinate the timing of bomber sorties with defense suppression targeting. In addition, a flight profile is developed which specifies where the low-altitude capability, if available, should be used. Within range constraints, the bomber is flown at low altitude as much as possible during the most vulnerable portion of the flight.

Depenetration and recovery routing are also planned for each bomber capable of such actions.

The development of missile plans (sorties) is somewhat less complex. In QUICK, those missiles equipped with a single warhead and those possessing a multiple re-entry vehicle (MRV) capability are allocated to a single target. For these missile delivery systems, the Plan Generator prepares launch times dependent upon user-specified conditions. For a plan in response to an enemy first strike, launch occurs on the receipt of early warning, plus any delay times specified in the data base. For a first strike plan, missiles may be launched so as to be coordinated at launch, or at the target, or at intermediate times.

For those missiles with a multiple independently targetable re-entry vehicle (MIRV) capability, including submarine-launched ballistic missiles, the sortie generation phase is somewhat different. The design concept used to treat MIRV-capable systems allows the weapon-to-target allocation to be developed without regard to "footprint" constraints; that is, constraints on the geographic configuration of targets assigned to a single missile equipped with MIRVs. After the weapons have been allocated, a separate processor collects all the MIRV weapons and their potential targets for further processing. The set of targets assigned to each group of MIRV weapons is then divided into subsets, each of which is a feasible assignment of targets for the weapons on a single missile. These assignments are subsequently tested by an analytical approximation to the physical constraints of the MIRV system to ensure the feasibility of the assignment.

1.6.3 Naval Forces. The play of strategic naval forces (excluding submarine-launched ballistic missiles) is modeled in an aggregated manner. The allocation of weapons to naval forces within QUICK, therefore, is a game within a total game, using parameters specified by the user. In particular, the probability that a weapon will destroy a naval target (assuming defense penetration) is a user input for naval play.

1.6.4 Target Defenses. The Plan Generator considers anti-missile and bomber defenses during both phases of plan development. For bombers, area attrition by air defense interceptors is modeled by a probability of bomber survival in enemy territory as a function of distance flown. This probability is modified by factors that consider estimated penetrator density and altitude of flight. Local bomber defenses provided by surface-to-air missiles (SAMs) are modeled by a single parameter which indicates the level of bomber defense available at each target. This parameter generates for each bomber the probability of survival at each target to which it is assigned.

Missile defenses are also divided into two categories, area and terminal. The plan generation process considers only a random area ballistic missile defense system, one in which each incoming object has the same probability of being assigned an interceptor.

1.6.5 Plan Evaluation. The weapon allocator of the Plan Generator is a valuable evaluation tool. Because it determines the most desirable assignment of weapons to targets for a given force, it can be used to compare different force structures (each optimally allocated to the enemy target system). In addition, for each type of weapon used in the allocation, the Plan Generator produces an estimate of the potential contribution toward the objectives of the plan that might be made if additional weapons of that type were available. The allocator can thus be used as a major exploratory tool.

The Plan Generator also includes an optional processor which may be used to summarize the allocation and to provide an expected-value estimate of its results. Provision is also included to evaluate the allocation for variations in the values of planning parameters which describe the weapons and targets considered during the allocation phase.

1.7 System Interfaces

The plan generation process provides a detailed missile and bomber strike plan suitable for input to the preprocessors of the following general war gaming simulators:

a. The Event Sequenced Program (ESP) maintained by the Joint Strategic Target Planning Staff

b. The Nuclear Exchange MOdel (NEMO) maintained by the Chief of Naval Operations (OP-963G).

Additionally, both the plan generation and output data process of QUICK provide outputs suitable for input into standard damage assessment systems. The Single Integrated Damage Analysis Capability System (SIDAC) is used by CCTC.

SECTION 2. USER/SYSTEM INTERACTION

The Central Operations Processor (COP), or QUICKs executive module, acts as an intermediary between the user and the operating system, and provides the communication between the QUICK system and the integrated data base (see figure 2). The COP acts accordingly by interpreting user commands written in imperative text English formats. These commands permit data construction, access, maintenance, validations and display, as well as provide QUICK module execution.

QUICKs text English command language contains lists of permissible entries (or words) that have meaning to the COP. In addition, the entries have a structure, or syntax, whereby separate entries (words) are strung together in a defined, logical fashion to provide mutual user understanding. QUICKs text English command language, then, is similar to formal English, which contains definable words and a grammar or set of rules describing how these words may be presented. As with formal English, words for QUICKs command language (and syntax) are in groups from which the grammar is defined. Specifically, words are defined (grammatically) as belonging to the groups of Verbs, Adverbs, Special Words, Operators, Nulls and Attributes.

2.1 Text English Dictionary

All permissible words within the developed language that have meaning to the COP are contained within the 'Dictionary' (a list of tables stored within the data base). These words contain attributes (as employed for target and weapon definition), plus other words necessary for the syntax development. Words within the dictionary are grouped as:

- o Attributes - List of variables necessary for data base construction (see section 3).
- o Verbs - A list of words describing the Action of each sentence.
- o Adverbs - A list of words used to modify the verb or introduce 'Clauses'.
- o Special Words - A list of words that cannot be classified as attributes, verbs, or adverbs.
- o Operators - A list of words or symbols necessary for defining mathematical expressions.
- o Nulls - A list of words that makes a sentence readable but that are not necessary for understanding a command.
- o Syntax Directory - A list that defines how words within a sentence may be connected.

2.2 Imperative Sentences

Each command generated by the user for input to the QUICK system is written as an imperative sentence. Since the system interprets all sentences, COP is the assumed subject. Some characteristics of sentences are listed below.

- o A verb initiates all sentences;
- o A sentence may contain only one verb;
- o Sentences are interpreted left to right;
- o Sentences may be of any length;
- o Blank(s) separate words;
- o More than one sentence may be placed on a record (either a data card or a VIP transmittal line);
- o Sentences may begin in any column of the record (card or VIP).

From the verb, the system has the ability to ascertain and execute the correct computer module and provide as input any text that follows the verb up to the occurrence of the next verb, which initiates a new set of instructions. The appearance of a following verb does not imply the initiation of a new module. A continuous list of sentences may be provided to a given module. For some cases, data records may be changed, new ones created and/or old ones deleted; all of these commands are met within one module, but separate verbs are required to define objectives.

2.3 Dictionary Entries and Sentence Usage

2.3.1 Dictionary Entries. The major groupings of dictionary values were outlined in subsection 2.1. Typical values for attributes are specified in section 3. Some typical entries for each sentence part are outlined in table 1.

2.3.2 Sentence Usage. The nature of the text English commands is completely generalized to the degree possible within the confines of the developed structure. Examples best illustrate their powerful usage. Consider the command:

CHANGE WHERE DESIG=AB123 SETTING CNTRYLOC = UR

This command will set attribute CNTRYLOC to UR for target designator AB123.

A command that will change more than one record could be:

Table 1. Typical Dictionary Values

SENTENCE PARTS	VALUES	DESCRIPTION
Verb	CREATE	Build a new data record
	CHANGE	Alter the contents of a developed data record
	DELETE	Delete a data record
	PRINT	Print a data record
	INDEX	Execute module INDEXER
Adverb	SETTING	Introduce a clause that defines data elements to be stored
	WHERE	Introduce a generalized clause that defines a subset of the data base
Special Words	ASCENDING	Describe a sorting order
	LINE	Introduce a print line
Operators	+ (or PLUS)	Add
	* (or TIMES)	Multiply
Nulls	FROM	-
	THE	-
	ON	-

```
CHANGE WHERE CLASS = U/I SETTING VAL=POP*10
```

This command will alter <u>all</u> records under target class U/I. The attribute VAL will be set to attribute POP multiplied by 10. Note that mathematical expressions may be written within a command.

A create command would be:

```
CREATE SETTING CLASS=MISSILE LAT=100000N
LONG=1260600W DESIG=AA009
```

A new missile record will be created with the values stored as specified within the command.

SECTION 3. ATTRIBUTE INPUT AND STANDARD OUTPUT

3.1 System Inputs

The primary input to the QUICK system is the data base. The data requirements of the QUICK system, and hence the effort and time required to prepare the data base will vary according to the objectives, nature, and scope of the specific planning task involved. Notwithstanding this fact, the total volume of input required to support a wide range of studies is substantial and can involve extensive research and coordination. Consequently, as indicated in the first chapter, CCTC maintains and periodically updates a QUICK data base. This data file may be viewed as a master data base, in that it contains more information than is required to produce a single set of Red and Blue plans. The data preparation process is the construction of text English commands to extract selected data from the file (and other external sources) and prepare a game data base which is appropriate for the plan which is to be developed. (Table 2 provides an example of the type of data maintained in the QUICK data base.)

The three principal data sources used in assembling the data maintained in the CCTC QUICK data base are the CCTC Resource File, the air order of battle files (AOB files) prepared by the Defense Intelligence Agency (DIA), and various manually prepared inputs provided by the SAGA. While the majority of the required data are retrieved from the existing automated source files maintained by CCTC, certain data are related directly to the plan being developed and are therefore not available from these files. These data, e.g., the specific weapons assigned to each type delivery vehicle and the staging of bombers at various airfields, are usually prepared by the user and added to the data base via text english commands.

The information included in the data base is categorized by CLASS, e.g., bombers, and by TYPE within class, e.g., B-52. Fifteen classes may be used to describe the targetable-type installations included in the data base. Data categories typical within each target class are shown in table 3. There is no restriction in the naming of target classes. In addition to these target classes, auxiliary data classes (table 3) are used to enter weapon-type data such as the specific composition of a bomber payload (bombs, air-to-surface missiles (ASMs), electronic countermeasures (ECMs), and decoys) and geographic-type data required by the system. Geographic-type data are required to be defined for bomber routing. For example, within the Plan Generator, penetration and depenetration routing of aircraft is controlled through the use of corridors established by the planner. The data defining each of the route points associated with these corridors are included in the auxiliary class segment of the data base.

Each item entered in the data base, e.g., a bomber squadron, is defined using a variable number of attribute-value pairs. The attribute-value

Table 2. Typical Data Base Elements Included in QUICK

- OFFENSIVE WEAPONS
  - Types
    - Strategic Bombers
    - Strategic Missiles
    - Tactical Nuclear Bombers
    - Tactical Nuclear Missiles
  - Numbers
  - Characteristics
    - Numbers and Yield of Warheads
    - Accuracy
    - Reliability
    - Range
    - Speed
    - Electronic Countermeasures (ECMs)
- DEFENSIVE WEAPONS
  - Types
    - Manned Interceptors
    - Surface-to-Air Missiles
    - Anti-Ballistic Missile (ABM) Systems
- TARGETS
  - Types
    - Offensive Weapon Launch Bases
    - Defensive Weapon Bases
    - Command and Control Sites
    - Early Warning Stations
    - Military Support Installations
    - Urban/Industrial Complexes
  - Characteristics
    - Geographic Location
    - Vulnerability
    - Value

Table 3. QUICK Classes

TARGET CLASS
Offensive missiles
Offensive bombers
Tankers
Defensive command and control
Interceptor aircraft
Offensive command and control
Nuclear storage sites
Airfields
Naval targets
Troops
Communications
Miscellaneous (e.g., engineer facilities)
Urban/industrial targets
Area ABM defense components
Reserved for future use

AUXILIARY CLASS	PURPOSE
PAYLOD	Identifies weapons and penetration aids carried by a missile or bomber
BOMB, ASM, RV, MRV, MIRV, FACTOR	Provides warhead characteristics for gravity bombs, ASMs, missile reentry vehicles (RV), etc.
MSLWEP, BMBWEP, TNKWEP	Defines missile, bomber, and tanker weapon systems
PENCOR, DEPCOR	Identifies penetration and depenetration corridors
WEPGRP	Provides weapon group data
RECOV	Identifies recovery base data
REFUEL	Provides for refuel points
REGION	Provides for region points
COMPLX	Contains target complex data

pair consists of the attribute name, such as CLASS, and the value of that attribute, such as BOMBER. The order of input of the attribute-value pairs is immaterial, and no upper limit exists on the number of pairs which may be used to describe an item. As an example, table 4 reflects seven attribute-value pairs used to describe a missile squadron.

While there are no restrictions on the quantity of data that may be maintained in the data base, there are constraints (upper limits) on the amount of data the QUICK system can handle. A few of these upper limits are shown in table 5.

Besides the information in the data base, additional information is required at various stages in the execution of QUICK for the selection of system options, e.g., type of printed output desired or designation of a specific weapon to be allocated against a particular target.

3.2 Primary Outputs

The primary outputs of the war game are estimates of losses to the primary military forces resulting from the nuclear exchange. Using a CCTC damage analysis system (such as SIDAC) and the ground zeros simulated in the QUICK game, it is possible to perform vulnerability analysis calculations on any category of military or industrial value for which there are geographic distribution data available. In addition to damage summaries, it is possible to determine time distributions of various quantities, such as megatons delivered or targets destroyed. Some of the above information is routinely presented as part of the standard summary output. Other results can be printed on request. If a game is repeated using different sets of random numbers, statistics representing the distribution of results may be computed manually.

Additionally, and as described in section 2 previously, nonprogrammer users may use the text English PRINT verb to generate output to investigate the results of any module or program. The types of these reports are very generalized.

The output of the Plan Generator is not only the war plan, in terms of allocations of individual weapons to individual targets, but also expected values of the survivability of each target class (based on planning factors). An auxiliary output from the allocation phase is a set of estimates of the contribution that additional weapons of each type would make toward achieving the objectives of the plan. Thus, for problems in which an estimate of expected target destruction is adequate, the Plan Generator is sufficient in itself.

As indicated below, some typical examples of QUICK output are shown in figures 3 and 4.

a. Figure 3 describes the detailed bomber plan which is output by the Plan Generator for each bomber sortie.

b. Figure 4 depicts the detailed missile plan output by the Plan Generator.

Table 4. Typical Data Base Item

ATTRIBUTE	ATTRIBUTE DESCRIPTION	TYPICAL VALUE
CLASS	Class name	MISSILE
TYPE	Type designation	MM-1
SIDE	Side (Red or Blue)	BLUE
LAT	Latitude (degrees, minutes, and seconds, north or south)	482030N
NOPERSQ	Number of missiles per squadron	50
NALERT	Number of missiles in an alert (ready) status	40
PLABT	Probability of a launch abort	0.05

Table 5. QUICK Data Constraints

CONSTRAINT	UPPER LIMIT
Targets (total)	Open-ended
Missiles plus Bomber (types/side)	100
Warhead types (total)	50
Payload types (per side)	40
Bomber penetration corridors (per side)	30
Weapon groups (per side)	250
Weapons (per group)	1,000

① PRINT NUMBER 3 DETAILED PLAN

② SORTIE SEQUENCE 285

③ SIDE 1 GROUP 12 CORRIDOR 7 SORTIE 5 INBASE 2108 INDV 4 MNT= 36 NPL= 19 IREG= 1 IALERT= 1 TYPE= 2

④ IREF= -4 ASSIGNED REF= 5 IDPEN= 4 ASSIGNED DEPEN= 0. 0 PAYLOAD= 4 FUNCTION=1RA

⑥ CHANGE DATE 07/79	⑤	TIME ⑥(HDT)	PLACE ⑦(KPL)	EVENT ⑧(JTP)	EVENT TYPE ⑨	LATITUDE ⑩	LONGITUDE ⑪	CUMULATIVE ⑫ TIME	WARHEAD ⑬ TYPE	DGR ⑭	DGY ⑮	DESIG ⑯
	1	-7.740	2108	2	LAUNCH B	0441200N	1030559W	-7.74	0	0	0	00000
	2	3.093	5	4	REFUEL	0690850N	1061522W	-4.65	0	0	0	00000
	3	4.660	51	5	INSECTOR	0730000N	0850000E	0.01	0	0	0	00000
	4	0.000	0	20	DOGLEG	0730000N	0850000E	0.01	0	0	0	00000
	5	0.000	0	19	GO LOW	0730000N	0850000E	0.01	0	0	0	00000
	6	3.388	0	18	GO HIGH	0603643N	0612910E	3.40	0	0	0	00000
	7	0.139	2839	8	DROPBOMB	0593609N	0602904E	3.54	1	8	23	AD741UR
	8	0.036	2380	8	DROPBOMB	0594500N	0600000E	3.58	1	0	0	AD444UR
	9	0.115	39	5	INSECTOR	0590000N	0585449E	3.69	0	0	0	00000
	10	0.063	1	14	LAUN ASM	0583537N	0581916E	3.75	4	-6	11	AD703UR
	11	0.328	2807	0	ASM TGT	0564752N	0531134E	4.08	0	-6	11	00000
	12	0.046	2801	8	DROPBOMB	0581733N	0575440E	3.80	1	-11	-17	AD709UR
	13	0.416	38	5	INSECTOR	0570633N	0520000E	4.22	0	0	0	00000
	14	0.621	1	14	LAUN ASM	0552502N	0432727E	4.84	4	77	52	AD448UR
	15	0.335	2735	0	ASM TGT	0554633N	0373408E	5.17	0	77	52	00000
	16	0.164	2384	8	DROPBOMB	0545659N	0411800E	5.00	1	0	0	AD637UR
	17	0.304	44	5	INSECTOR	0522959N	0410314E	5.30	0	0	0	00000
	18	1.302	68	5	INSECTOR	0420000N	0400000E	6.61	0	0	0	00000
	19	0.000	2402	16	RECOVER	0420000N	0400000E	6.61	0	0	0	00000

Figure 3. Detailed Bomber Plan from Plan Generator (Part 1 of 4)

HEADING	LABEL	DESCRIPTION
①	PRINT NUMBER	Print request number, as on print request card
②	SORTIE SEQUENCE	Sortie sequence number
③	SIDE	Side for which plan is generated: 1 = BLUE, 2 = RED
	GROUP	Weapon group index number, as assigned in program PLANSET
	CORRIDOR	Penetration corridor index number for weapon
	SORTIE	Sortie index number
	IMBASE	Launch base index number
	INDV	Index to the individual vehicles on the base
	MNT	Total number of event lines in the plan
	NPL	Number of event lines
	IREG	Geographic command and control region index number
	IALERT	Index to alert status: 1 = alert, 2 = nonalert
	TYPE	Index to the weapon type table
④	IREF	Refueling index number: IREF Greater than 0 = Number of user-assigned refuel area 0 = No refuel -1 = Buddy refuel -2 = Buddy refuel: original number/squadron halved -3 = Air-breathing missile -4 = Single automatic refuel -5 = Two refuels required, both automatic
	ASSIGNED REF	Index of refuel area assigned if automatic tanker allocation is utilized
	IDPEN	Depenetration corridor index number
	ASSIGNED DEPEN	Depenetration corridor index number is reassigned here when last target is an ASM target; values are supplied for both primary and alternate sorties
	PAYLOAD	Index to payload table
	FUNCTION	Weapon function code

Figure 3. (Part 2 of 4)

HEADING	LABEL	DESCRIPTION
⑤	---	Sequence number of events within sortie plan (History table index) and a "C" if the event was changed
⑥	TIME (HRT)	Time between events in hours; in line one, the value represents the time from start of game
⑦	PLACE (KPL)	Represents the index numbers of launch bases, refuel areas, defense zone boundaries, targets, and recovery points; for LAUNDCOY events, it is the number of decoys launched (if positive) or terminated (if negative); otherwise, KPL is zero
⑧	EVENT (JTP)	Index numbers to QUICK event codes
⑨	EVENT TYPE	Mnemonic indentifier of event

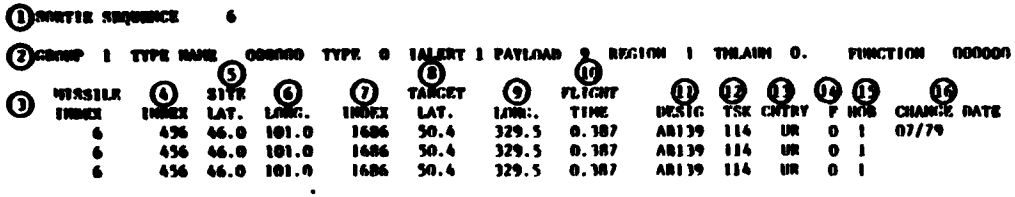
LAUNCH M = Launch missile
LAUNCH B = Bomber launch
REFUEL = Refuel
DROPBOMB = Drop bomb
MISATTR = Missile attrition event
ENTERREF = Enter refuel area (tankers)
LEAVEREF = Leave refuel area (tankers)
ABORT = Abort
LAUN ASM = Launch ASM
LAUNDCOY = Launch decoy
RECOVER = Recover
CHANGALT = Change altitude
GO HIGH = Go to high altitude
GO LOW = Go to low altitude
DOGLEG = Dogleg

Figure 3. (Part 3 of 4)

HEADING	LABEL	DESCRIPTION
(10)	LATITUDE	Latitude of event in geographic coordinates
(11)	LONGITUDE	Longitude of event in geographic coordinates
(12)	CUMULATIVE TIME	Cumulative time at each event
(13)	WARHEAD TYPE	Warhead index number; nonzero only for DROPBOMB OR LAUN ASM events
(14)	DGX	Target offset in fiftieth of nautical miles (positive west)
(15)	DGY	Target offset in fiftieth of nautical miles (positive north)
(16)	DESIG	Target Designator plus Country Location
(17)	CHANGE DATE	Date of recorded change initiated by C, I, A card in module ALTPLAN

If dropbomb or ASMTGT, coordinates are those of target lead DESIG

Figure 3. (Part 4 of 4)



① SORTIE SEQUENCE 6

② GROUP 1 TYPE NAME GGGGGG TYPE 0 IALERT 1 PAYLOAD 2 REGION 1 THLAUN 0. FUNCTION 000000

③ MISSILE INDEX	④ INDEX	⑤ SITE LAT.	⑥ LONG.	⑦ INDEX	⑧ TARGET LAT.	⑨ LONG.	⑩ FLIGHT TIME	⑪ DESIG	⑫ TSK	⑬ CNTRY	⑭ F	⑮ HOB	⑯ CHANGE DATE
6	456	46.0	101.0	1686	50.4	329.5	0.387	AB139	114	UR	0	1	07/79
6	456	46.0	101.0	1686	50.4	329.5	0.387	AB139	114	UR	0	1	
6	456	46.0	101.0	1686	50.4	329.5	0.387	AB139	114	UR	0	1	

HEADING	LABEL	DESCRIPTION
①	SORTIE SEQUENCE	Sortie sequence number
②	GROUP	Weapon group number
	TYPE NAME	Missile type
	TYPE	Missile type index
	IALERT	Abort status (1=alert, 2=nonalert)
	PAYLOAD	Payload index
	REGION	Launch region
	THLAUN	Time of launch
	FUNCTION	Weapon function code
③	MISSILE INDEX	Missile index
④	INDEX	Site index
⑤	SITE LAT.	Weapon site latitude
⑥	LONG.	Weapon site longitude
⑦	INDEX	Target index
⑧	TARGET LAT.	Target latitude } *Lat/long of lead DESIG target;*
⑨	LONG.	Target longitude } does not include offset data.
⑩	FLIGHT TIME	Flight time (hours)
⑪	DESIG	Target designator code
⑫	TSK	Target SIOP table number
⑬	CNTRY	Target country code
⑭	F	Target flag
⑮	HOB	Height of burst (0=ground; 1=air) - Note: This reflects ASCHOB at the time of this print; ABORT will change ASCHOB if, after a call to IGETHOB, the optimum HOB disagrees with ASCHOB.
⑯	CHANGE DATE	Date of recorded change initiated by C, 1, A card in module ALTPLAN

Figure 4. Detailed Missile Plan from Plan Generator

SECTION 4. APPLICATIONS

Two primary fields of application for the QUICK system are war plan evaluation and future force posture studies. Because the models in the system deal with various facets of the war, studies of smaller scope can also be carried out with QUICK. Among these are: the effect of changes in targeting criteria (such as target values or required damage levels); variations and uncertainties in basic parameters for friendly and opposing forces; and the effect of different levels of ballistic missile defense, deployments of defense, and allotments of penetration aids among the attack force.

The remainder of this section discusses each of these study types in turn, and also comments on problems to which QUICK should not be applied.

4.1 Potential Applications

4.1.1 War Plan Evaluation. One of the major uses of the QUICK system is to generate the hypothetical Red Integrated Strategic Offensive Plan (RISOP). The QUICK-developed RISOP can then be used to evaluate other plans for general war, such as the Single Integrated Operational Plan (SIOP). This evaluation can be carried out using an existing system developed for SIOP/RISOP gaming, such as the U.S. Navy's Nuclear Exchange MOdel (NEMO) or the Joint Strategic Target Planning Staff's Event Sequenced Program (ESP). Alternatively, a pseudo-SIOP could be developed by the QUICK Plan Generator.

The principal advantage of the use of QUICK for RISOP generation is that the shorter development time permits testing the SIOP under a variety of enemy plans. This sensitivity analysis makes it possible to determine if there are likely conditions under which the SIOP is unsatisfactory and/or can be improved.

4.1.2 Force Posture Studies. Another use of the QUICK system is for the study of future force postures, i.e., an analysis involving the evaluation of forces and/or force deployments postulated for a future time frame. An example of such an application is the study of force requirements wherein the primary quantity of interest is the number of weapons (such as Minuteman) in the U.S. strategic inventory, and how variations in these numbers will change the U.S. capability to wage a strategic nuclear war. Sensitivity of results can also be investigated with respect to various assumptions, such as condition of war initiation and intelligence on enemy numbers and characteristics. While war game results are only one type of input to such studies, they provide a useful set of quantitative trade-offs for supporting the determination of recommended force postures.

For future force posture studies, QUICK can be used not only in its most straightforward form but also in a special rapid-response mode, capitalizing on the Plan Generator as a short-cut war plan evaluator. The usual force posture study will proceed from selection of input from the data base through plan generation and sortie generation. The short form of analysis will use only the data input process and the Plan Generator. Damage estimates for this type of analysis will thus be based on the "planning factor" type data used by the Plan Generator, such as the probabilities of penetration and destruction before launch (DBL). The most effective utilization of QUICK in this way implies a continuing effort, through its exercise, to build up experience and accumulated results so that "new" study requests are only variations of previous cases.

Another possible type of force posture study is the evaluation of a new weapon system, such as an orbital bombardment system. Since such weapons involve new aspects of timing and coordination, the war game approach can add significantly to an evaluation of the impact that the introduction of such weapons might have on a nuclear exchange. The QUICK system is sufficiently flexible to accommodate the introduction of some new weapon systems by the appropriate choice of parameters and characteristics.

Other force posture variations are also possible, such as the investigation of the effect of changing nuclear weapons carried on strategic bombers from one or two large weapons to several smaller ones.

4.1.3 Studies of Alternate Strategies. In addition to providing a capability for rapid analysis of variations in force levels and choice of weapons, the system permits the study of alternative ways of using the forces postulated. The inherent flexibility of the Plan Generator, e.g., to withhold certain types of forces, or to avoid certain classes of targets, allows study of many options and alternatives in the use of a given force posture.

4.2 Inappropriate Applications

At the other end of the spectrum, it may be inadvisable to attempt to use QUICK for overly detailed problems in its current configuration. For example, QUICK should not be used in an attempt to determine (a) the capabilities of various communication equipment and network in a command and control system, (b) an optimal mix of warheads, decoys, chaff, and electronic countermeasures for use in ballistic missile penetration, or (c) appropriate evasive tactics for bombers engaged by the enemy. At present, the system does not contain sufficient detail to treat such questions.

QUICK is not intended as a tool for study of limited wars, and it is not recommended that it be modified for such application. Limited war games can provide some of the starting conditions for a general war game, but there should be a definite distinction between the two. The primary reason for the separation is that there is little agreement on how the movement of ground forces and other conventional actions would interact with the other portions of a general war.

As a final precaution, the user is cautioned against attempting to run the game for all possible conditions of interest to determine sensitivity of results to certain variables. One may want to study several different force levels for each side under various starting conditions, warning assumptions, and estimates of reliability. Taking all combinations of these variables can result, however, in hundreds of possibilities. If many replications of each are attempted for validating statistics, the computer requirements become excessive. Furthermore, there can be more results available than can humanly be usefully assimilated, even with computer-generated summaries. The recommended approach is to make a series of basic runs of the cases of greatest interest, plus a limited number of excursions from the basic conditions. This approach will provide just about the same amount of useful information with greatly reduced computer and analysis time.

GLOSSARY

Circular Error Probable (CEP): An indicator of the delivery accuracy of a weapon system, used as a factor in determining probable damage to a target. It is the radius of a circle within which half of the missiles/projectiles are expected to fall.

Computer Program: A program expressed in computer code designed to solve a class of problems, or specializing on a specific problem when appropriate parametric values are supplied.

Computerized War Gaming Model: A computer program, or series of programs, designed to simulate the logic of actions or interactions of a conflict situation and provide results for subsequent analysis.

Cross Targeting: The deliberate mixing of weapon types assigned to individual targets so that unexpectedly high failure rates for any specific weapon type, or group of weapons, will not result in a catastrophic failure of the war plan.

Damage Expectancy (DE): Probability of achieving a desired level of damage considering the probability of weapon arrival (PA) and the probability of damage (PD), i.e., DE=PAxPD.

Data Base: An organized collection of data records with similar or associated characteristics either to be operated upon by a system or contributing to the operation of a system.

Directing Assignment: A term used within QUICK to identify weapon-to-target assignments which are directed (fixed) by the user.

Dynamic: Pertaining to a quantity which is affected by time, energy, or power, and therefore indicates a relatively transient or unstable (changing) condition.

ESP Model: The Event Sequenced Program used by the Joint Strategic Target Planning Staff (JSTPS) to simulate large-scale strategic warfare.

Event: A happening in time, either within a simulation or in reality.

Expected Value: The average or mean value which would be obtained if a given event were repeated many times.

Fixed Assignments (weapon fixes): A term used within QUICK to identify weapon-to-target assignments which are directed (fixed) by the user.

FLAG: A code used in imposing weapon group restrictions within QUICK

General War: Armed conflict between major powers in which the total resources of the belligerents are employed, and the national survival of a major belligerent is in jeopardy.

PRECEDING PAGE BLANK-NOT FILMED

Input: Any factors, data, parameters, values, or instructions required for proper operation of a model or submodel to produce game results.

Limited War: Armed conflict short of general war, exclusive of incidents, involving the overt engagement of the military forces of two or more nations.

NEMO Model: The Nuclear Exchange MOdel maintained by the Navy for simulation of two-sided global nuclear war.

Nuclear Vulnerability Assessment: The estimation of probable or expected effects of hypothetical nuclear attacks on population, forces, and resources.

Optimizing: Selecting the most advantageous solution or course of action in a competitive situation within constraints imposed by the conditions of the problem.

Posture: Relative place or position; state or condition at a given time, especially in relation to other persons or things.

Probability of Arrival (PA): The probability of a delivery vehicle delivering a weapon which detonates as planned.

Probability of Damage (PD): The probability that damage will occur to a target expressed as a percentage or as a decimal.

RISOP: A hypothetical Red Integrated Strategic Offensive Plan.

SIDAC: Single Integrated Damage Analysis Offensive Plan.

SIOP: The Single Integrated Operational Plan.

Terminal ABM Defense: The ballistic missile defense provided for a single target or set of collocated targets by short-range defensive systems. QUICK uses a subtractive terminal defense model. Each incoming warhead or terminal decoy is assigned an interceptor until the local supply of defensive missiles is exhausted.

DISTRIBUTION

Addressee	Copies
CCTC Codes	
C124 (Reference and Record Set)	3
C124 (Stock)	6
C126	2
C313	1
C314	7
C630	1
DCA Code	
205	1
EXTERNAL	
Chief, Studies, Analysis and Gaming Agency, OJCS ATTN: SFD, Room 1D935, Pentagon, Washington, DC 20301	2
Chief of Naval Operations, ATTN: OP-654C, Room BE781 Pentagon, Washington, DC 20350	2
Commander-in-Chief, North American Air Defense Command ATTN: NPXYA, Ent Air Force Base, CO 80912	2
U.S. Air Force Weapons Laboratory (AFSC) ATTN: AFWL/SUL (Technical Library), Kirtland Air Force Base, NM 87117	1
Director. Strategic Target Planning. ATTN: (JPS), Offutt Air Force Base, NE 68113	2
Defense Technical Information Center, Cameron Station, Alexandria, VA 22314	12
	42

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (when data entered)

CCTC-

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

(14) 1. REPORT NUMBER: TM 153-77-CH-1

2. GOVT. ACCESSION NO.: AD-A087 409

3. RECEIPIENT'S CATALOG NUMBER:

4. TITLE (and Subtitle): (6) THE CCTC QUICK-REACTING GENERAL WAR GAMING SYSTEM (QUICK). General Description. Change 1.

5. TYPE OF REPORT & PERIOD COVERED: (9) Technical memo.

6. PERFORMING ORG. REPORT NUMBER:

7. AUTHOR(s): (10) Dale J. Sanders, Paul F. M. Maykrantz, Jim M. Herrin

8. CONTRACT OR GRANT NUMBER (s): DCA 100-75-C-0019

9. PERFORMING ORGANIZATION NAME & ADDRESS: System Sciences, Incorporated, 4720 Montgomery Lane, Bethesda, Maryland 20014

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS:

11. CONTROLLING OFFICE NAME & ADDRESS: Command and Control Technical Center, Room BE-685, The Pentagon, Washington, DC 20301 (18) SBIE

12. REPORT DATE: (11) 1 June 1977

13. NUMBER OF PAGES: 40

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): (12) 42 (17) AD-E100 372

15. SECURITY CLASS. (of this report): UNCLASSIFIED

15a. DECLASS./DOWNGRADING SCHEDULE:

16. DISTRIBUTION STATEMENT (of this report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in block 20, if different from report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (continue on reverse side if necessary and identify by block number)

War Gaming, Resource Allocation

20. ABSTRACT (continue on reverse side if necessary and identify by block number)

The CCTC Quick-Reacting General War Gaming System (QUICK) is used to generate missile and bomber plans suitable for strategic war gaming, provide statistical output summaries, and supply inputs to external simulators.

This document is a nontechnical description of QUICK that includes a broad description of system operation, input data requirements, available outputs, and

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

33

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (when data entered)

409658

CH-1

20. ABSTRACT (Continued)

typical applications.

QUICK is documented extensively in a set of Computer System Manuals (Series 9-77) published by the Command and Control Technical Center (CCTC), Defense Communications Agency (DCA), The Pentagon, Washington, DC 20301.